2.0 Management and Monitoring

2.1 Management

2.1.1 Levels of Management Responsibilities

As described in the OSMP (Section 2.4), there are four levels of preserve management. Individual preserves in the HMP Preserve may have different levels of required management responsibility depending on criteria such as land ownership, and time that the preserve was established (pre- or post-HMP). The four levels of management are:

Level 1 - Property Management: Management of property boundaries and trash removal.

Level 2 - Preserve Management: Level 1 management plus management of the overall natural character of the preserve, maintenance of existing habitat values, fire prevention, invasive species control, and management of public use facilities such as trails, fences, and signage.

Level 3 - Species Monitoring and Management: Management Levels 1 and 2 plus species-specific and habitat-specific monitoring as required in conditions of HMP approval and species coverage, existing mitigation agreements, and/or the MHCP (Vol. III). This standard is required for all post-HMP projects and associated preserves.

Level 4 - Regional Monitoring: Monitoring trends in species populations, habitat condition, and wildlife movement across the MHCP planning area and beyond by analyzing data collected on Level 3 preserves. The Wildlife Agencies are responsible for analysis of regional monitoring data.

2.1.2 City-owned Preserves

Except for the municipal golf course (now named The Crossings at Carlsbad), City-owned lands have been managed at Level 2 by the City. This includes basic land management, erosion control, and invasive species removal. Active management and restoration monitoring of the golf course began in July 2007. This activity is being conducted by Dudek. CNLM will take over permanent management when the 5-year restoration is complete. In addition, the Carlsbad Watershed Network has conducted extensive invasive species removal in riparian areas owned by the City, including the Lake Calavera area. Level 3 management of City-owned properties will begin in early 2009.

2.1.3 Preserves not Owned by the City

Existing Hardline Areas (i.e., areas that were already conserved at the time the HMP was approved) will be managed according to pre-existing management funding and arrangements. The majority of Existing Hardline Areas are managed by CDFG (five ecological reserves), and various HOAs. Subject to available funding, and in consultation with the USFWS, CDFG will prepare and implement a preserve management plan consistent with HMP Section F for those portions of habitat areas under its jurisdiction and control (IA Section 15.2). Areas conserved since approval of the HMP will be managed as required by the HMP and MHCP (Level 3).

2.1.4 Major Threats and Issues of Concern

Based on discussions with preserve managers, the top threats for all preserves are (1) unauthorized human access, and (2) invasive species. Annual invasive species removal programs, regular patrols, fencing, signage, gates, and public education are the ongoing management actions taken by preserve managers to address these threats. However, the HMP Preserve is a highly fragmented system surrounded by dense urban development. As such, the pressure on the preserve system from edge effects (including invasive species) and public use is much greater than it would be on a larger, more intact system surrounded by rural development. The most difficult problems to solve are the effects of unauthorized access, which include trails that damage and further fragment the habitat, presence of parasitic cowbirds from equestrian use, trash and illegal dumping, disturbance of wildlife from off-leash dogs and outdoor cats, and public safety issues. Section 2.1.6 discusses enforcement, which is key in solving these issues.

Preserve-specific threat assessments can be found in CNLM's preserve-specific annual reports (www.carlsbadhmp.org/documents) and in Appendix B, which summarizes threats and activities in preserves managed by CNLM and CDFG. For information about how specific threats are being addressed on CNLM-managed properties, refer to the annual work plans, which can be obtained from the webpage above.

2.1.5 Key Management Activities

A review of management activities across the HMP Preserve during the current reporting period was conducted at the level of the Management Unit (Appendices B and C). Although each preserve is the responsibility of a single preserve management entity (the primary Preserve Manager), secondary management entities such as local organizations and volunteer groups often contribute significantly to preserve management, biological

resource management, and public outreach within a given management unit. Additional details can be found in the preserve-specific annual reports and annual work plans, which are available on-line as described above.

2.1.6 Enforcement

City Enforcement Efforts

The City is continuing to take a multi-pronged approach to the enforcement within the HMP Preserve. The City's HMP Ordinance (Chapter 21.210 of the Zoning Ordinance) codifies the enforcement measures and remedies available for enforcement of unauthorized habitat take. These measures include: stop work notice, corrective action, owner notification, recordation of a Notice of Violation, prohibition of development permits, investigation fee, criminal penalties, abatement of public nuisance, and civil action. The City continues to work with the Wildlife Agencies, as well as the U.S. Army Corps of Engineers, Regional Water Quality Control Board, and California Coastal Commission where applicable, when reports of potentially unauthorized habitat impacts are received. No enforcement cases were opened in the current reporting period.

While the above referenced ordinances apply to unauthorized habitat take, many impacts to the local preserves such as erosion, trash disposal, and excessive noise occur simply from unauthorized entry or activities. The Preserve Managers do not always have adequate resources to address these trespassing issues and have relied upon support from the City of Carlsbad Police Department (CPD). During the reporting year, CPD staff has been working with the local Preserve Managers to improve coordination and work with the City Attorney's office to draft local ordinances and procedures to assist in identification and enforcement of potential violations. Two examples of this coordination are detailed below.

Since most of the public enter the HMP preserve areas through established trails, and many of these trails are part of the Citywide Trail System, a multi-departmental team has been formed to draft a Trail Safety Enhancement Program. City staff from CPD, Parks and Recreation, and Planning are developing recommendations to assist in trail safety and education of trail users about the sensitivity of the natural environments and proper activities within preserves.

CNLM-Managed Properties

CNLM (three full-time staff) patrolled their preserves on a regular basis, sometimes during biological surveys and sometimes during directed patrolling efforts. During the

patrolling efforts, CNLM spent a considerable amount of time blocking off and patrolling trails that are not part of the designated trail system. Fences and signs were installed directing users to the designated trails and contact was made with local users to inform them of the newly established, legal trail system. Specific problem areas are described below.

Box Canyon (La Costa Villages). During the summer of 2007, there were many problems with trespass at Box Canyon. During that year CNLM hired an enforcement company to patrol the area from about mid-August to mid-October. This year, CNLM hired two part time San Diego County rangers to patrol the Box Canyon area every Friday, Saturday and Sunday from the beginning of May 2008 through the middle of October 2008. Using this method combined with increased cooperation from the City of Carlsbad Police Department, the level of trespass into Box Canyon dropped significantly. Approximately 10 or more people per week tresspassed into the canyon between May and June of 2007. This number dropped to 10 per month from June to October of 2007 with increased patrolling, and 10 per month from May to October of 2008, with essentially no trespass Friday through Sunday, as rangers had 4 to 8 hour shifts on those days. Citations were issued when trespassers were caught in Box Canyon, but the majority of the effort was placed on deterring the public from entering Box Canyon. This approach was very effective, and reduced the effort for both CNLM and the Police Department.

Flightline (Carlsbad Oaks North). The entire area has been used illegally for many years by mountain bikers, who not only created jumps, bridges, and many miles of trails, but also posted the site on web pages, and even conducted training exercises on the property. The bikers were disappointed when the Carlsbad Oaks North development commenced, which resulted in a loss of much of their biking routes. As a result, some bikers started to create new biking routes late in 2005 to early 2006. Prohibitive fencing had been placed at the entry from uphill, and at the downhill portion of this trail. Since the Fall of 2007, most of the biking activity had ceased.

CDFG-Managed Properties

CDFG wardens patrol the coastal areas primarily looking for unauthorized fishing or hunting activity, but also conduct sweeps in the western and central basins for unauthorized use, including horseback riders, ATVers, and bikers. The Carlsbad Police Department also assisted in the winter by patrolling the trails at Batiquitos Lagoon. Volunteers with the Batiquitos Lagoon Foundation provided information (including preserve rules) to trail users and visitors to the nature center. In addition, signs and kiosks

are located at trail entrances and around the least tern nesting sites and other sensitive areas that are off limits to the public.

2.2 Monitoring Results

The core conservation strategy for the MHCP is to manage an interconnected system of multiple habitats which, theoretically, will conserve multiple species. As such, the status of many covered species can be assessed by tracking the amount of their preferred habitats that have been conserved/impacted using Habitrak (MHCP Vol. III, Appendix A.2). However, a number of species (narrow endemic species, vernal pool species, and listed species) have site-specific permit conditions, which means that individual populations should be tracked using GIS (MHCP Vol. III, Appendix A.1). Table 15 provides a list of species with site-specific permit conditions by general habitat type (only those that occur in Carlsbad are included), and survey dates for each preserve. Currently, active monitoring only occurs on preserves managed by CNLM or CDFG, and therefore, these are the only preserves included in the table. If a species is absent from a preserve, it is noted in the table.

This section will focus on the status of species with site specific permit conditions (herein called priority species). GIS data showing species observations from 2000 to 2008 were pulled from the following databases: California Natural Diversity Database (CNDDB), USFWS species data, USFWS Final Critical Habitat, CDFG (from surveys conducted by CDFG, not included in CNDDB), San Diego Natural History Museum Bird Atlas, and CNLM (Figures 5–11). Data were also requested from biological consultants who conducted project-specific species surveys in Carlsbad. Some data were obtained from Merkel and Associates, Helix Environmental, and Recon; however, much of the project-specific data for Carlsbad has not yet been received.

Locations of major populations or critical locations within the HMP, as determined by the MHCP (1998 data), were also included in Figures 5–11. Critical locations are areas or populations that are critical for the species to be adequately covered by the MHCP. Major populations are populations that are large enough to be self-sustaining with a minimum of active management, or that support enough breeding individuals to contribute to the overall stability of the species.

Table 15. Summary of Surveys Conducted for Priority Species

Species	Agua Hedionda Lagoon ER	Batiquitos Lagoon ER	BV Creek ER	BV Lagoon	Calavera/ Rob Ranch E	Carlsbad Highlands	Carlsbad Oaks N	Encinas Ck	Kelly Ranch	Rancho La Costa
Lagoon/Coastal Species										
Belding's savannah sparrow	1973-2006	1973-2006 2001-2008	No lagoon species or habitat in this preserve	1973-2006	Lagoon habitat and species do not occur in these preserves					
California least tern	Not present	2001-2008		Not present						
Light-footed clapper rail	2000-2008	2000-2007		2000-2007						
Western snowy plover	Not present	2001-2008		Not present						
Riparian Species										
Least Bell's vireo	2008	Not present	2008	Not present	2009	Not present	Not present	2009	Not present	Not present[1]
SW willow flycatcher	SWWF does not occur in these preserves									
Vernal Pool Species										
California Orcutt grass	There are no vernal pools on any of these preserves									
Little mousetail										
San Diego button-celery										
Spreading navarretia										
Riverside fairy shrimp										
San Diego fairy shrimp										
Vernal Pool/Upland Spp										
Thread-leaved brodiaea	Not present	Not present	Present; No surveys	Not present	2006-2008	2008	2007-2008	Not present	Not present	2005-2008
San Diego thornmint	Not present				2008	Not present	2007-2008	Not present	Not present	2005-2008
Upland Species										
Del Mar manzanita	Not present								2009	2005-2008
Del Mar mesa sand aster	Not present	unknown	Not present							
Encinitas baccharis	Not present									
California gnatcatcher	7/17/08	6/20/08	6/13/08	Not present	2007	5/23/08	04/2007	2009	2003-2007	2005, 2007

Based on the data sources described above, the current status of priority species is shown in Figures 5-11. When viewing the maps, know that:

- Species "areas," as shown in the legend, originated from the CNDDB database. The exact meaning of these areas is unknown, but it is presumed that they refer to occupied/potentially occupied habitat or species locations for which the accuracy includes a large margin of error.
- Species "locations" are direct observations of a given species with no reported margin of error for accuracy.
- The symbols and colors that represent species areas, species locations, major or critical populations, and USFWS final critical habitat vary from map to map. This was done to ensure that all of the information on a given map, much of which is overlapping, was viewable. Therefore, it is important to look at the legend to see what each color or symbol refers to.
- Critical locations and major populations are based on 1998 MHCP data, and only those that fall within the HMP are included in the figures. In addition, populations discovered since 1998 have not been evaluated as critical locations or major populations.
- Some of the major populations and critical locations reported in the MHCP do not show on Figures 5–11. There are two reasons for this: (1) the area has been developed, and/or (2) the data points fall outside of the HMP. The original MHCP maps showing critical locations and major populations are included in Appendix D for reference.

The rest of this section will include a discussion of the status of each priority species, organized by general habitat type (as in Table 15). Vernal pool/upland species are those that can occur in either habitat. Each species description will include a summary of most recent surveys and results, general condition of the species within Carlsbad, major threats, and management actions taken to protect the species. Many of the species are managed indirectly through habitat management, which includes invasive species removal, unauthorized access control, and erosion control.

2.2.1 Lagoon/Coastal Species

Belding's Savannah Sparrow
Passerculus sandwichensis beldingi

Critical Locations and Major Populations

Critical locations and major populations are located in Agua Hedionda Lagoon and Batiquitos Lagoon.

Monitoring Results

In 2006, 32 coastal salt marshes in California were surveyed as part of an ongoing census effort. Results of surveys conducted within Carlsbad are summarized below. See Figure 5 for additional information.

	1973	1977	1986	1991	1996	2001	2006
Buena Vista Lagoon	0	5	1	0	0	6	5
Agua Hedionda Lagoon	37	16	45	13	29	22	24
Batiquitos Lagoon	0	20	47	50	36	66	37

Overall Condition and Major Threats

Approximately 3,135 breeding territories were detected in California during the 2006 census. This is the highest total since counts began in 1973, and 8.2% higher than the next highest count, reported in 2001 (Zembal et al. 2006). However, the number of territories was markedly lower in 2006 than in 2001 at both Agua Hedionda and Batiquitos Lagoons. Predation by ravens and crows is a major threat to the species at Batiquitos Lagoon (N. Frost, CDFG, pers comm.). Other problems include human trespass, off-road bicycles, and off-leash dogs (Zembal et al. 2006). Changing habitat conditions may also be affecting this species.

Agua Hedionda Lagoon: The 2006 surveys revealed approximately 25% fewer territories than in 2001. Tidal flow is consistent due to regular dredging, resulting in good potential for habitat restoration in this lagoon; however, flow is constricted due to the narrowness of the opening. CDFG recently successfully eradicated *Caulerpa* (a highly invasive algae) which threatened aquatic life and habitats.

Batiquitos Lagoon: Past restoration of this lagoon has resulted in the expansion of pickleweed, which is a critical component of the sparrow's habitat, and the Belding's numbers doubled between 1996 and 2001. Since then there has been a 44% reduction in Belding's presumably due to changes in its habitat. For example, freshwater inflow from urban runoff at the eastern edge of the lagoon is resulting in a change from

picklweed-dominated marsh to brackish marsh. The rest of the picklweed belt is too narrow to support the species (Zembal et al. 2006). However, new habitat has grown in around E1 (C. Beck, pers comm.).

Management Actions Conducted to Protect the Species

Habitat management; predator control (nest exclosures) on Batiquitos. The top priorities for CDFG to protect this species are habitat enhancement and restoration, and funding of a statewide census.

California Least Tern

Sterna antillarum browni

Critical Locations and Major Populations

Critical locations occur in all three lagoons. The population at Batiquitos Lagoon is considered a major population.

Monitoring Results

Annual least tern monitoring was conducted at Batiquitos Lagoon. Results are summarized below. Biological data are collected in the following categories: estimation of breeding pairs (based on number of nests, less the number of re-nests), and productivity (total number of nests, number of eggs, number of chicks hatched, number of chicks reaching fledgling age, number of fledglings surviving to disperse). Mortality and predation data are also collected. See Figure 5 for additional information.

	2001	2002	2003	2005	2006	2007	2008
Nests	222	226	615	596	627	594	610
No. Pairs	192	203-205	574	571	601	575-578	596
Estimated No. of Fledglings	73-99	53-66	155-228	109-128	223-270	146-226	143-187

Overall Condition and Major Threats

At Batiquitos Lagoon Ecological Reserve, the populations are stable. There has been a steady increase in clutch size over the last 3 years, but poor fledgling production. One of the greatest threats is predation from black-crowned night herons (*Nycticorax nycticorax*), gull-billed terns (*Gelochelidon nilotica*), American crow (*Corvus brachyrhynchus*), gulls (*Larus* spp.) and coyote (*Canis latrans*).

Management Actions Conducted to Protect the Species

Habitat management; predator control on Batiquitos Lagoon.

Light-footed Clapper Rail

Rallus longirostris levipes

Critical Locations and Major Populations

Critical locations and major populations occur at all three lagoons in Carlsbad.

Monitoring Results

Clapper rails are typically monitored by two methods – spring call counts, and winter high tide counts. In 2008, the 30th consecutive annual census of clapper rails in California coastal wetlands was conducted by mapping territorial pairs based on their calls. Results are available through 2007, and are summarized below for areas within Carlsbad (Zembal et al. 2007). Overall, the numbers appear to be increasing over time. See Figure 5 for additional information.

	2000	2001	2002	2003	2004	2005	2006	2007
Buena Vista Lagoon	5[1]	3[1]	6[1]	5[1]	5[1]	6[1]	8[1]	8[1]
Agua Hedionda Lagoon	2	2	1	4	5	4[1]	7[1]	4
Batiquitos Lagoon	2[1]	3[1]	3[1]	5	11	16[1]	19[1]	22

[1]Unpaired individuals (all others are pairs)

Overall Condition and Major Threats

A total of 443 pairs of light-footed clapper rails exhibited breeding behavior in 19 marshes in 2007. This is the largest statewide breeding population detected since the counts began in 1980, representing an 8.3% increase over the former high count in 2006 and a 36% increase over the 24-year high reached in 1996. Batiquitos Lagoon held a record high of 22 pairs, as did Los Penasquitos Lagoon and Creek with 12 pairs. Three other small subpopulations were at record or recent highs including Buena Vista Lagoon with 8 pairs, San Elijo Lagoon with 12 pairs, and San Diego River with 6 pairs (Zembal et al. 2007).

Management Actions Conducted to Protect the Species

Captive breeding and release program, nest platform augmentation, and predator control conducted by CDFG. Additional priorities for CDFG are habitat enhancement and restoration, and funding of a statewide census.

Western Snowy Plover

Charadrius alexandrinus nivosus

Critical Locations and Major Populations

Critical locations and major populations are located at all three lagoons.

Monitoring Results

Annual western snowy plover monitoring was conducted only at Batiquitos Lagoon. Results are summarized below. See Figure 6 for additional information.

	2001	2002	2003	2005	2006	2007	2008
Nests	19	25	29	24-25	16	5	6
Pairs or Breeding Adults	8-9[1]	10+[1]	26[2]	24[2]+	18[2]	4[2]	8[2]+
No Fledglings	10-16	17	9-10	9-12	10+	2-3	3-4

[1]Pairs
[2]Breeding Adults

Overall Condition and Major Threats

The numbers of nests, breeding adults, and fledglings have plummeted since about 2006. The drop in snowy plover numbers may be due to the growth of cord grass in the last couple of years and predator problems.

Management Actions Conducted to Protect the Species

The following has been conducted on Batiquitos Lagoon Ecological Reserve to encourage snowy plover nesting: **(1) Habitat management** - the sites are cleared of weedy material prior to the nesting season and in 2008 three pathways approximately 5 feet across were cleared so that snowy plover chicks could access the water on the northeastern side of E1. Next fall, CDFG staff will clear vegetation along the eastern/northeastern side of E1 to allow easier access to the shoreline for foraging plover adults and chicks; **(2) Predator control** - personnel remove predators that threaten both plovers and terns, exclosures (wire cage) are placed over the nests to protect the eggs from predators, monitoring of both plovers and terns to assess number of breeding adults and annual productivity, monitors also note predation events and coordinate with predator control personnel.

2.2.2 Riparian Species

Least Bell's Vireo

Vireo bellii pusillus

Critical Locations and Major Populations

There are no critical locations or major populations of least Bell's vireo in the City of Carlsbad.

Monitoring Results

Focused species surveys were conducted on three preserves in 2008, and incidental sightings during other activities were recorded. A total of approximately 9-11 pairs are estimated to occur in these preserves. Additional pairs have been observed during project-specific surveys on various properties; however, these data have not yet been provided to the City. See Figure 6 for additional information.

Preserve	2008 surveys	Estimated No. (Pairs)
Agua Hedionda Ecological Reserve	X	2
Calavera Hills/Robertson Ranch East	X	2
Carlsbad Oaks North	X	0
Buena Vista Creek Ecological Reserve	X	3-4
North County Habitat Bank (Encinas Creek)		1
Rancho La Costa (the Greens)		1-2

Overall Condition and Major Threats

Least Bell's vireo habitat is well-protected and appears to be in good condition on actively managed properties. Although no nest monitoring has occurred, this species appears to be breeding successfully in the Preserve. .

Management Actions Conducted to Protect the Species

Habitat management.

SW Willow Flycatcher

Empidonax traillii extimus

Critical Locations and Major Populations

There are no critical locations or major populations in the City of Carlsbad. USFWS critical habitat is located along Agua Hedionda Creek, just east of the Carlsbad city boundary (Figure 6).

Monitoring Results

All available survey data indicates that the southwestern willow flycatcher does not presently occur in Carlsbad.

Overall Condition and Major Threats

Not applicable (see above).

Management Actions Conducted to Protect the Species

Management of potentially suitable habitat

2.2.3 Vernal Pool Species

California Orcutt Grass
Orcuttia californica

Little Mousetail
Myosurus minimus ssp. *apus*

San Diego Button-Celery
Eryngium aristulatum var. *parishii*

Riverside Fairy Shrimp
Streptocephalus woottoni

San Diego Fairy Shrimp
Branchinecta sandiegoensis

Spreading Navarretia
Navarretia fossalis

Critical Locations and Major Populations

There are three vernal pool complexes in Carlsbad: (1) Poinsettia Lane Train Station, (2) Hieatt property, north of the airport, and (3) Manzanita Partners property, east of El Camino Real and south of the airport. The Poinsettia Lanes vernal pool has been identified as a critical location for all vernal pool species. Populations of these species have also been identified as major populations. The other vernal pools are not identified as critical locations or major populations.

Monitoring Results

No current monitoring results are available for any of these species. However, all of the vernal pool species listed above, as well as Orcutt's brodiaea (*Brodiaea orcuttii*, not covered by MHCP), are known to occur on the Poinsettia Lanes vernal pools, based on 1993 surveys (Dudek 1994; Anita Hayworth, Dudek, pers comm.). In addition, San Diego fairy shrimp and San Diego button-celery occur on the Manzanita Partners site. See Figures 7 and 8 for additional information.

Overall Condition and Major Threats

The Poinsettia Lanes vernal pool preserve does not currently have active management. The right-of-way (ROW), where the pools are located, are mowed as

part of regular ROW maintenance by the North County Transit District (NCTD), but not actively managed. The site has a high percentage of exotic species. The NCTD set aside $50,000 for management as mitigation for Poinsettia Lanes Train Station project impacts. This money is being held by CDFG. In addition, a watershed buffer was set aside to protect the Poinsettia Lane vernal pool as mitigation for the Water's End project. A $100,000 mitigation fee was paid to the City for management of this property. The Water's End vernal pool buffer area was restored to native coastal sage scrub habitat. Dudek completed a 5-year restoration monitoring/management program. The Wildlife Agencies conducted a site visit in July of 2008 and found the condition of the habitat to be very good; however, final sign-off will not occur until permanent management is in place.

The vernal pools on the Hieatt property were restored by Helix Environmental Planning Inc. (Helix). The restoration plan was initiated on March 2, 2006, and was to last 2 years. Restoration monitoring reports have not been submitted to the City or Wildlife Agencies, and no request has been made for sign off on the success of the restoration. The current status of these vernal pools is unknown. Prior to restoration, the pools did not contain any sensitive species, but contained the following vernal pool indicator species: dwarf wooly-heads (*Psilocarphus brevissimus* var. *brevissimus*), water pygmyweed (*Crassula aquatica*), chaffweed (*Centunculus minimus*), and grass poly (*Lythrum hyssopifolia*).

The vernal pool area on the Manzanita Property was enhanced/restored in 2000, and five years of maintenance and monitoring was conducted by Dudek. The five-year success criteria outlined in the restoration plan were met, although no official sign-off by the Wildlife Agencies has occurred. Seven existing degraded pools were enhanced, seven suspected historic vernal pools were restored, and adjacent native upland habitat was enhanced (Dudek 2005The current condition of this restored vernal pool area is good (A. Hayworth pers. comm.); at project completion, all vernal pools held water during the rainy season, all pools had at least one of four vernal pool target plant species present, San Diego fairy shrimp were detected at five of the pools, coastal sage scrub habitat surrounding the pools is mature and healthy, and non-native species were under control and did not pose a threat to the vernal pools (Dudek 2005). Long-term management of the vernal pools was not a requirement for this property.

Management Actions Conducted to Protect the Species

Currently, the Water's End watershed buffer is being managed by the HOA, and the vernal pools are managed by the NCTD (Level 1 management). The $150,000 set aside for management of the vernal pool and the vernal pool buffer has not been used.

The buffer area has been fenced and signed to protect from unauthorized access and to provide public education. The other two vernal pools do not have active management or monitoring at this time.

2.2.4 Vernal Pool/Upland Species

San Diego Thornmint

Acanthomintha ilicifolia

Critical Locations and Major Populations

Critical locations and major populations are located in scattered locations throughout Carlsbad, mostly in private HOA preserve lands. Other populations of San Diego thornmint are located within the Carlsbad Oaks North and La Costa Villages preserves.

Monitoring Results

Monitoring results have been obtained only on the CNLM-managed properties. Note that plant counts can vary tremendously depending on rainfall and if counts were conducted during the flowering season or when plants were in their vegetative state.

	Number of Plants Observed by Year			
Preserve	**2003**	**2006**	**2007**	**2008**
Carlsbad Oaks North	N/A	No surveys	210	505
La Costa Villages	1,000[1]	150	26	194

[1] Estimate rather than direct count
[2] N/A = Not applicable; prior to preserve inception date.

Overall Condition and Major Threats

This species appears to be well protected on CNLM-managed properties, and no current threats, aside from non-native forbs and grasses, have been identified. The status of thornmint on other properties in Carlsbad has not been assessed.

Management Actions Conducted to Protect the Species

This species is under active management within Carlsbad Oaks North and La Costa Villages. However, HOA managed properties generally only include Level 1 management.

Thread-leaved Brodiaea

Brodiaea filifolia

Critical Locations and Major Populations

Critical locations/major populations are located in the following preserves: Calavera Hills Phase II, Carlsbad Highlands Ecological Reserve, Rancho Carrillo, Fox-Miller, Brodiaea Preserve, and La Costa Villages.

Monitoring Results

Plant counts of this species can vary tremendously depending on timing and amount of rainfall, and if counts were conducted during the flowering season (flwr) or when plants were in their vegetative state (veg). CNLM has determined that the plant count during the flowering season may represent only 2%-26% of the actual population size, since only a fraction of a population flowers at a given time. For example, the number of flowering plants at La Costa Villages in 2008 was 8,291. However, plant counts made during the vegetative season over only a portion of occupied habitat was 29,589 plants. The actual population is much higher, and too large to count. Due to the large variability in the plant counts, as described above, this measure may not provide useful information when assessing species status.

	Number of Plants Observed by Year				
Preserve	**2004**	**2005**	**2006**	**2007**	**2008**
Calavera Hills Phase II					
Carlsbad Highlands ER					22 flwr
Carlsbad Oaks North	N/A[1]	N/A[1]	unknown	0 flwr	400 veg 104 flwr
La Costa Villages[2] The Greens	0[3]	2,500-3,000[3]	83[3]	11,000[4] veg 5 flwr	8,291 flwr

[1] N/A = Not applicable; prior to preserve inception date

[2] Population counts conducted during the flowering period represent 2 to 26% of the actual population (only 2-26% of plants flower in a given year). See CNLM's annual report for more details.

[3] Unknown if surveys were conducted during flowering or vegetative state.

[4] Survey did not cover entire area.

Overall Condition and Major Threats

This species appears well protected on Calavera Hills Phase II, Carlsbad Oaks North, Carlsbad Highlands Ecological Reserve, Fox-Miller restoration area, and La Costa Villages preserves. The Brodiaea Preserve (a TET bankruptcy property) has not been actively managed; however CDFG is expected to take over management in 2009. Approximately 125 flowering individuals were observed during a site visit that was conducted by CDFG on May 14, 2008. In addition, the site was found to be heavily infested with fennel and non-native grasses. The status of the Rancho Carrillo population is unknown; this property is managed by the Rancho Carrillo HOA.

The greatest threat to thread-leaved Brodiaea is invasive species, especially non-native grasses and other annuals. In addition, off-road vehicles may pose a threat to the population on Carlsbad Highlands Ecological Reserve.

Management Actions Conducted to Protect the Species

The Calavera Hills II, Carlsbad Oaks North, and La Costa Villages populations are actively managed through invasive species removal, and annually monitored by CNLM. In addition, CNLM is conducting a pilot study to determine the best method of invasive species removal. See Appendix B or CNLM's annual reports for more details. In 2007, Recon was under contract to provide management for the Fox-Miller property. Due to contractural issues, the management performed by RECON included mostly mowing, and minimal invasive species treatment and access control. Helix EPI took over management and mowed the property in June of 2008. However, after repeated requests by the Wildlife Agencies, protective fencing has not been installed.

2.2.5 Upland Species

Del Mar Manzanita

Arctostaphylos glandulosa ssp. c*rassifolia*

Critical Locations and Major Populations

Critical locations/major populations are located on preserve lands owned by the City, the County, private HOAs, and La Costa Villages.

Monitoring Results

Del Mar manzanita has been surveyed on La Costa Villages Preserve. Approximately 9 plants were located in 2008. Originally, 800 plants were estimated to occur; however, based on a new morphological dichotomous key, it was determined that only a fraction of the manzanita onsite is Del Mar Manzanita. CNLM located the majority of the Del Mar manzanita individuals, confirmed the morphology of each individual, and then mapped the individual if it was Del Mar manzanita.

Overall Condition and Major Threats

The species is well protected within the La Costa Villages Preserve, and no threats to the species require attention at this time. It should be noted, however, that no Del Mar manzanita seedlings were located, which may need to be studied in the future. If this trend continues, it will be necessary to investigate how to get seedlings to establish within the preserve (e.g., fire, manual scarification and/or stratification). The status of Del Mar manzanita on other properties has not been assessed.

Management Actions Conducted to Protect the Species

Habitat management.

Del Mar Mesa Sand Aster

Corethrogyne filaginifolia var. *linifolia*

Critical Locations and Major Populations

There are no critical locations in Carlsbad. The closest major population is at the southern boundary of Carlsbad. The majority of the population within the MHCP Subregion is within the City of Encinitas, but may extend into Carlsbad on private HOA lands.

Monitoring Results

No monitoring is currently taking place.

Overall Condition and Major Threats

Unknown.

Management Actions Conducted to Protect the Species

Habitat management.

Encinitas Baccharis

Baccharis vanessae

Critical Locations and Major Populations

The closest major population is at the southern boundary of Carlsbad. The majority of the population is within Encinitas, but may extend into Carlsbad on private HOA lands. Within this major population, there are critical locations identified that may occur within Carlsbad, although this is difficult to determine from the scale of the map (Figure 10).

Monitoring Results

No monitoring is currently taking place.

Overall Condition and Major Threats

Unknown.

Management Actions Conducted to Protect the Species

Habitat management.

California Gnatcatcher

Polioptila californica californica

Critical Locations and Major Populations

No major or critical populations have been identified in the MHCP. However, the regional stepping-stone corridor that provides dispersal opportunities between south San Diego County and Camp Pendelton (and into Orange and Riverside Counties) runs right through Carlsbad. In addition, several areas of USFWS Critical Habitat have been identified within the City (Figure 11).

Monitoring Results

The following table includes results from CNLM and CDFG monitoring, as well as information from database searches.

Preserve or Area Name	Preserve Manager	Acres CSS*	Most Recent Survey	Most Recent Number	Next Survey
Agua Hedionda Lagoon ER	CDFG		7-17-08	4 pairs + 5 individuals	2009
Alemere-County off-site	CNLM	60	2007	3 pair	2010
Aviara Conservation Area			Before 2000	10-15 pairs	
Batiquitos Drive	City-CNLM	Approx 2 acres	No recent survey data		2009
Batiquitos Lagoon ER	CDFG		6/20/08	1 pair + 8 individuals	2009
Buena Vista Creek ER	CNLM-CDFG	12	2008	3-4 pair	2010
Calavera Hills Phase II	CNLM	110	2008	12 pairs	2010
Carlsbad Highlands ER	CDFG		5/23/08	1 pair + 4 individuals	2009
Carlsbad Oaks North	CNLM	73	2008	1 pair	2009
Carlsbad Village	City-CNLM	Approx 10 acres	No recent survey data	1 individual observed in 2006	2009
Choumas-Pappas-(CAGN Core Area)	CNLM	80	2007	9 pairs + 2 single males	2010
Kelly Ranch HCA	CNLM	49	2007	4 pair	2010
La Costa Canyon Park	City-CNLM	Unknown			2009
La Costa /Romero	City-CNLM	Approx 10 acres	No recent survey data		2009
La Costa Villages	CNLM	480-500	2007	27 pair, 4 individuals	
Lake Calavera	City-CNLM	70	2004-5	4 pair, 2 unpaired	2009
Los Monos	City-CNLM	10	No recent survey data		2009
Macario Canyon	City-CNLM	Approx 15	No recent survey data		2009
Municipal Golf Course	City-CNLM/ Dudek	Approx 120 acres	2008	10	2009
Nelson-County off-site	CNLM	21	2007	1 pair	2010
N. County Habitat Bank	CNLM	1		1 indv heard, 2008	2009
Poinsettia Park	City-CNLM	6	No recent survey data		2009

Preserve or Area Name	Preserve Manager	Acres CSS*	Most Recent Survey	Most Recent Number	Next Survey
Robertson Ranch East	CNLM	28 +10 acres of reveg	2008	4 pair	2009
Robertson Ranch West	CNLM	<1 ac; Reveg in progress		1 individual heard in summer 2008	
Veteran's Memorial Park	City-CNLM	Approx 10	No recent survey data		2009
TOTALS		**1,178 + acres**		**Approx 94 pair and 32 individuals 2007 - 2008**	

Overall Condition and Major Threats

Although a complete assessment has not been conducted, currently available data show at least 1,178 acres of protected coastal sage scrub habitat in the Carlsbad HMP, and approximately 94 pair and 32 individual gnatcatchers. Note that project-specific survey data, has not been included in this analysis. Therefore, the actual number of gnatcatcher territories in the HMP is likely to be higher than 94. The coastal California gnatcatcher appears to be thriving in Carlsbad, and is well-protected within the preserves. The main threat to this species within the HMP is habitat degradation due to edge effects, mountain biking, and unauthorized trails.

Management Actions Conducted to Protect the Species

Habitat management, continual patrolling and protection, fence and sign maintenance, nonnative species removal, erosion control activities, habitat evaluations and monitoring.